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Attorney Docket No. 029169-9001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Appln. of George P. POLLACK

Application No. 09/587,948

Filed: June 6, 2000

For: "INSULATION DISPLACEMENT ELECTRICAL PLUG ASSEMBLY AND METHOD OF MAKING PLUG ASSEMBLY"

Art Unit: 2833

Examiner: F. Figueroa

Confirmation No. 9711

I, Arlette Porter-Sherley hereby certify that this correspondence is being deposited with the US Postal Service as first class mail in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, Mail Stop Appeal Brief – Patents on the date of my signature.

Arlette Porter-Sherley
Signature

December 22, 2003
Date of Signature

APPELLANT'S BRIEF ON APPEAL

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Pursuant to the Notice of Appeal filed in the above-identified application on October 22, 2003 and 37 C.F.R. § 1.192, Applicant submits this brief in triplicate. Applicant is a small entity. The small entity filing fee of $165.00 accompanies this brief.

Real Party In Interest

The real party in interest is Eastco Corporation, which is the assignee of the sole inventor, George P. Pollack.

Related Appeals And Interferences

There are no related appeals or interferences.

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Status Of Claims And Amendments

This is an appeal from the final rejection mailed July 22, 2003, rejecting all of the claims pending in the case (nos. 1-13 and 15-21). The claims on appeal, 1-13 and 15-21, are reproduced in clean form in the Appendix beginning on page 13.

Status Of Amendments

Claims 15 and 17 were amended after the final rejection to correct clerical errors. These amendments were entered on October 16, 2003, and are reflected in the claims reproduced in clean form in the Appendix.

Summary Of The Invention

The invention comprises:

1) unique electrical terminals;

2) an electrical plug assembly using such unique terminals; and

3) a method of making the plug assembly using the unique terminals.

The terminals are illustrated, for example, in Figures 8-12 of the application. Each terminal is of one-piece construction and has a crimp flange (28) and at least one (and preferably a pair) of insulation piercing knives (30) and a blade (32) for insertion into an electrical socket, all of which are integrally connected together. (Specification, page 9, lines 3-10.) The insulation piercing knives (30) of each electrical terminal 16 are spaced apart from one another in a substantially tandem-aligned relationship. The piercing knives are integrally connected to the crimp flange (28) by being cut-out and bent upwardly from the bottom portion of the crimp flange. Thus, the leading end of an insulated conductor (14) can be placed between the side portions (34) of a crimp flange (28) and over the piercing knives (30) whereupon the crimp

flange is crimped onto the insulated conductor (14) by bending the side portions (34) of the crimp flange (28) toward one another over and downwardly toward the insulated conductor (14). This causes the side portions (34) of the crimped flange (28) to press the insulated conductor (14) downwardly upon the piercing knives (30) which pierce and displace the outer layer of the insulation and make a substantially gas-tight electrical connection with the inner electrical wire within the insulated conductor. After the crimping is completed, the electrical terminal (16) is inserted into a channel (22) of a plug housing (12) as best seen in Figures 2 and 3 of the application. (Specification, page 9, line 18 to page 10, line 11.) The blade (32) of the electrical terminal (16) may also be provided with a web portion having a plurality of kinks or undulations (40). The kinks or undulations define lance-formed barbs (40) that abut the surface of the channel (22). This helps resist removal of the electrical terminals from the housing. (Specification, page 10, lines 25-34.)

Issues

I. Whether claims 1-3 and 21 are properly rejected under 35 U.S.C. § 103(a) as being unpatentable over Govaerts (BE 0544048) in view of Bellinger (U.S. Patent No. 5,567,187).

II. Whether claims 5-11 are properly rejected under 35 U.S.C. § 103(a) as being unpatentable over Bellinger in view of Govaerts.

III. Whether claims 13, 15 and 16 are properly rejected under 35 U.S.C. § 102(b) as being anticipated by Gilbert (U.S. Patent No. 2,229,288).

IV. Whether claim 17 is properly rejected under 35 U.S.C. § 103(a) as being unpatentable over Gilbert in view of Takemasa (U.S. Patent No. 6,045,408).

V. Whether claims 18-20 are properly rejected under 35 U.S.C. § 103(a) as being unpatentable over Gilbert in view of Ozaki (JP 09-213436).

Grouping Of Claims

It is Applicant's intention that each of the following groups of rejected claims each stand or fall together:

I. Claims 1-4 and 21;

II. Claims 5-12;

III. Claims 10 and 11; and

IV. Claims 13 and 15-20.

ARGUMENTS

This case is an example of an Examiner seeking to defeat patentability by using an Applicant's disclosure as a blueprint to knit together prior art and his personal opinion of what those skilled in the art would bring to that art. The fact that the inventive concepts underlying the claimed invention may seem relatively simple in hindsight has led the Examiner to improperly ignore the underlying patentability of Applicant's invention.

Rejection Of Claims 1-3 And 21 Under 35 U.S.C. § 103(a)

Claims 1–3 and 21 were rejected in the final office action of July 22, 2003 as unpatentable over Govaerts (BE 0544048) in view of Bellinger (U.S. Patent No. 5,567,187).

Among this grouping of claims, only claim 1 is independent. Independent claim 1 calls for an electrical terminal comprising an integral combination of a crimp flange and an insulation piercing knife. The insulation piercing knife projects from the bottom of the flange. A blade for insertion into an electrical socket extends from the crimp flange.

The Examiner argues that Govaerts discloses an electrical terminal comprising:

a) a crimp flange (12) with a pair of upwardly directed opposite side portions (11) and a bottom plate;

b) insulation piercing knives tandem aligned and integral with the crimp flange and projecting from the bottom plate; and

c) a terminal extending from the crimp flange for insertion into an external electrical socket.

From this, the Examiner concludes that Govaerts discloses the invention of the rejected claims except that it shows a round terminal instead of a flat blade. He then argues that Bellinger shows that a blade is an equivalent structure known in the terminal connector art and, therefore, one of ordinary skill in the art would have found obvious the substitution of blade terminals for the round terminals of Govaerts.

Govaerts is directed to a plug housing carrying two electrical terminals. Govaerts is fatally deficient *vis-à-vis* claim 1 in at least two important ways: 1) it does not teach or suggest an electrical terminal with a crimp flange; and 2) the piercing pins cited by the Examiner appear to be embedded in the body of the plug housing and not to be part of or integral with the terminal or any other structure in the device.

Contrary to the Examiner's position, element 11 of the Govaerts device is not a crimp flange since it is structured to receive an abutting surface 13 in the top half of the plug housing which apparently presses the wire down between the arms of this element spreading it out (rather than crimping it closed) and impaling the wire on the pins. Bellinger does not remedy this fatal shortcoming in the teaching of Govaerts. As to the piercing pins of Govaerts, it is noted that no translation is available and, therefore, the teaching is taken from the Figures only. Applicant believes that these Figures show (and the Examiner has not disagreed), that the piercing pins are

separate elements embedded in the body of the plug housing. This is contrary to the teaching of the present application which consistently calls for insulation piercing knives integral with a crimp flange. Again, Bellinger does not remedy this fatal shortcoming in the teaching of Govaerts.

Additionally, it is noted that during the course of the prosecution of this application, Applicant also argued that Govaerts "does not involve a crimp flange." The Examiner responded to this in the pending final rejection by noting that *The American Heritage Dictionary of the English Language*, 4th Edition, defines "crimp" as "to bend or mold into shape." He argued from this that the Govaerts' flanges are bent into shape and, therefore, they are properly considered crimp flanges.

First, the *American Heritage* definition is *in apropos* since it fails to reflect how one skilled in the art would understand the term "crimp flange." A more appropriate definition can be found, for example, in *Modern Dictionary of Electronics* 158 (Rudolf F. Graf ed., 7th ed., (Newnes 1999):

> **crimp-type termination** — Open-barrel or closed-barrel termination in which a stripped wire is inserted into or through a tube that is crimped to the wire with an appropriate tool. (Exhibit A).

Element 12 of Govaerts is not properly considered a crimp flange (as the Examiner seeks to do) since it fails to produce a crimp-type termination, as that term is properly understood in the art and in the above dictionary definition. Furthermore, and most importantly, there is no flange disclosed in Govaerts that is "bent into shape," so even the *American Heritage* definition does not support the Examiner's position.

It is also noted with respect to the rejection of claims 1-3 and 21 that during the course of the prosecution of this application, Applicant argued that the piercing pins of Govaerts "are not integral with the terminal." The Examiner notes in the pending final rejection that the term "integral" is sufficiently broad to embrace constructions united by such means as fastening and welding. In the case cited by the Examiner in support of this proposition, *In re Holt*, the Board of Appeals noted that the Appellant's specification did not expressly restrict the meaning of "integral" to one piece and that such a meaning was irreconcilable with the language of claim 1 in the case. In the present case, it is expressly taught that the electrical terminals are of a one-piece construction (*e.g.*, Specification, page 9, line 4) and such a construction is completely consistent with the figures in the case and the language of the claims. Therefore, it is improper to interpret Govaerts as teaching integral piercing pins.

Rejection Of Claims 5-11 Under 35 U.S.C. § 103(a)

Claims 5-11 were rejected under 35 U.S.C. §103 as being unpatentable over Bellinger in view of Govaerts. The Examiner argues that Bellinger discloses a plug housing (20) with opposite ends and spaced apart channels, a pair of insulated conductors (36), and a pair of electrical terminals including a crimp flange, a concave arcuate-shaped bottom portion and a blade connected to the crimp flange. The Examiner acknowledges that Bellinger fails to disclose insulation piercing knives, but argues that it would be obvious to supply this teaching from Govaerts. The Examiner also argues with regard to claims 6 and 7 that Bellinger shows the housing and the electrical terminal with a one-piece construction, with regard to claims 8 and 9 that Bellinger shows the claimed structure in Figure 2 of that reference, and finally with regard to

claims 10 and 11 that Govaerts shows a pair of insulating piercing knives disposed in a tandem alignment with each other.

Among these rejected claims, only claim 5 is an independent claim. Claim 5 is directed to an electrical plug assembly, including a plug housing, a pair of insulated conductors and a pair of electrical terminals insertable into channels in the plug housing. The electrical terminals include a crimp flange with a pair of upwardly directed opposite side portions and a concave arcuate-shaped bottom portion extending therebetween. At least one insulation piercing knife is integral with the crimp flange and projects upwardly from the bottom portion into the space between the side portions of the crimp flange.

The principal reference cited by the Examiner in support of the rejection of claims 5-11, Bellinger, does describe a plug housing with channels, insulated conductors and electrical terminals connected to the conductors. However, Bellinger fails utterly to teach or suggest the insulation piercing which is the raison d'ętre of the claimed invention. In Bellinger, a portion of the insulation of the insulated wire must first be removed in order to establish electrical contact with flange arms (52). The flange arms, when ultimately crimped, grip the insulation-free wire portion but do not cooperate with or include any means for piercing the wire insulation. Piercing the wire insulation is unnecessary since the patent requires that the insulation be removed before the crimping is completed. Furthermore, contrary to the Examiner's position, it would not be obvious to supply this teaching from Govaerts because there is no insulation left to pierce in the Bellinger invention. Furthermore, Govaerts fails even to teach a crimp flange as required in claim 5 and as discussed above. It fails, as well, to teach an integral insulation piercing knife, also as discussed above.

Rejected dependent claim 6 drives home the inappropriateness of combining these references since it calls for the housing of the electrical plug assembly to be of a one-piece construction. Govaerts requires a two-piece construction since the conductors are gripped in that structure only by the action of joining the two halves of the housing. Therefore, the attempt to import the teaching of Govaerts into Bellinger fails.

Rejected dependent claim 10 requires that at least one insulation piercing knife of the electrical terminal is a pair of insulation piercing knives cut out and bent upwardly from the bottom portion of the crimp flange. Claim 11 further limits claim 10 by requiring that the insulation piercing knives be disposed substantially in tandem alignment with one another. The Examiner argues that Govaerts teaches this. Applicant respectfully disagrees. As far as Applicant is able to determine from the figures of this untranslated reference, the pointed pins are separate articles imbedded in the Govaerts' housing and not cut-out or bent upwardly from element 11. Claims 10 and 11 are, therefore, believed to be patentable on this independent basis.

Rejection Of Claims 4 and 12

Claims 4 and 12 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Bellinger and Govaerts as applied to claims 1 and 5, and further in view of Takemasa (U.S. Patent No. 6,045,408). Claim 4 is a dependent claim directed to the electrical terminal of claim 1 in which the blades include a web portion having barbs for abutting against the plug housing to resist removal of the electrical terminal. Claim 12 is a dependent claim directed to the terminal of claim 5 where the blades have web portions with a plurality of undulations defining lance-formed barbs which abut the plug housing and prevent removal from the housing. These claims are believed to be patentable over the noted combination of references on the basis of the above

noted patentability of the independent claims from which they respectively depend, claims 1 and 5.

Rejection Of Claims 13 and 15-16 Under 35 U.S.C. § 102(b)

Claim 13 is directed to a method of making a plug assembly including providing a housing and a plurality of electrical terminals with the unique features discussed above with respect to independent claims 1 and 5. Dependent claims 15 and 16 further limit independent method claim 13 by calling for the electrical terminals to have insulation piercing knives cut out and bent upwardly from the bottom portion of the crimp flange of the terminal and for the piercing knives to be provided substantially in tandem alignment.

Claims 13 and 15-16 were rejected as being anticipated by Gilbert (U.S. Patent No. 2,229,288). The Examiner argued that Gilbert teaches providing a plug housing with a plurality of terminals, passing insulated conductors through the channels in the housing, aligning the ends of the terminals with the wires, crimping the terminals to the conductors and securing the terminals in the channels of the housing. Gilbert, however, does not employ insulation piercing terminals nor an insulation piercing method. Rather, Gilbert requires that the insulation be removed from the conductor ends before assembling the electrical connector. This, of course, is completely at odds with the present invention in which piercing knives pierce and displace the outer layer of the insulation of an insulated conductor to achieve a substantially gas-tight electrical connection with the inner electrical wire within the insulated conductor. This essential element of the invention was given no weight in the rejection over Gilbert.

Method claims 13 and 15-16 are believed to be patentable based on the noted structural limitations of the unique terminals of the invention because these structural limitations affect the

method in a manipulative sense. They do not amount to the mere claiming of the use of a particular structure. The Examiner disagrees and therefore did not give the structural limitations in the claim patentable weight.

Applicant believes the Examiner is in error in refusing to give patentable weight to the structural features of the electrical terminals because these structural features are essential to the practice of the method. For example, the knife extending upwardly from the bottom portion of the crimp flange is essential to the practice of the claimed method: when the crimp flange is crimped, the insulated conductor is pressed downwardly onto the knife which, in accordance with the method of the claim, pierces and displaces the insulation of the conductor. The structural features of the electrical terminals are essential to the manipulations called for in the claimed method. The resulting method claim is patentable over Gilbert because, *inter alia*, Gilbert fails to teach or suggest crimping a crimp flange to press an insulated conductor down onto a knife to pierce and displace the insulation of the conductor, as required in the rejected method claims.

Rejection Of Claim 17 Under 35 U.S.C. § 103(a)

Claim 17 is a claim dependent on independent method claim 13 which stands rejected over Gilbert in view of Takemasa (U.S. Patent No. 6,045,408). This dependent claim is believed to be patentable on the basis of the patentability of claim 13, as discussed above.

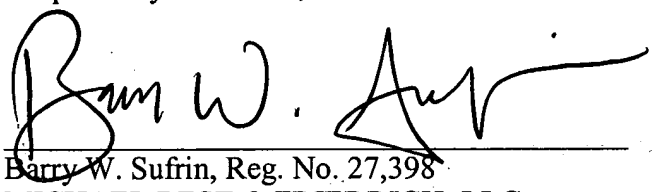
Rejection Of Claims 18-20 Under 35 U.S.C. § 103(a)

Dependent claims 18-20 were rejected as unpatentable over Gilbert in view of Ozaki (JP 09-213436). These claims, which are dependent on method claim 13, are believed to be patentable on the basis of the patentability of claim 13, as discussed above.

CONCLUSION

35 U.S.C. § 103(a) For the foregoing reasons, Applicant respectfully requests that the Examiner's rejection of all of the pending claims (nos. 1-13 and 15-21) be reversed and these claims be indicated as allowable.

Respectfully submitted,



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Date: December 22, 2003

APPENDIX

1. An electrical terminal, comprising:

(a) a crimp flange having a pair of upwardly directed opposite side portions and a bottom portion extending between and interconnecting said side portions;

(b) at least one insulation piercing knife integral with said crimp flange projecting from said bottom portion into the space between said side portions; and

(c) a blade extending from said crimp flange for insertion into an electrical socket.

2. The terminal of Claim 1 wherein said at least one insulation piercing knife is a pair of insulation piercing knives cut out and bent upwardly from said bottom portion of said crimp flange.

3. The terminal of Claim 2 wherein said insulation piercing knives are disposed substantially in a tandem alignment with one another.

4. The terminal of Claim 1 wherein said blades includes a web portion connected to said crimp flange and a plurality of abutting undulations formed along opposite sides of said web portion defining barbs for abutting against a plug housing to resist removal of said electrical terminal therefrom.

5. An electrical plug assembly, comprising:

(a) a plug housing having opposite ends and defining a pair of spaced apart channels therethrough open at each of said opposite ends thereof;

(b) a pair of insulated conductors each having an end and an electrical wire and a layer of insulation covering said wire and being disposed at least partially within one of said channels of said plug housing; and

(c) a pair of electrical terminals each being insertable into one of said channels of said plug housing at one of said opposite ends of said plug housing, each said terminal including:

(i) a crimp flange having a pair of upwardly directed opposite side portions and a concave arcuate-shaped bottom portion extending between and interconnecting said side portions;

(ii) at least one insulation piercing knife integral with said crimp flange projecting upwardly from said bottom portion into the space between said side portions; and

(iii) a blade extending from said crimp flange for insertion into an external electrical socket for making an electrical connection.

6. The assembly of Claim 5 wherein said housing is of a one-piece construction.

7. The assembly of Claim 5 wherein each of said electrical terminals has a one-piece construction.

8. The assembly of Claim 5 wherein:

each of said electrical terminals has opposite ends; and

said crimp flange of each said electrical terminal is disposed at a rearward position on said electrical terminal adjacent to one of said opposite ends thereof.

9. The assembly of Claim 8 wherein said blade of each of said electrical terminals is disposed at a forward position on said electrical terminal opposite from said crimp flange and adjacent to the other end of said opposite ends of said electrical terminal and extending therefrom toward but spaced from said one opposite end of said electrical terminal.

10. The assembly of Claim 5 wherein said at least one insulation piercing knife of said electrical terminal is a pair of insulation piercing knives cut out and bent upwardly from said bottom portion of said crimp flange of said electrical terminal and disposed said side portions of said crimp flange of said electrical terminal.

11. The terminal of Claim 10 wherein said insulation piercing knives are disposed substantially in a tandem alignment with one another.

12. The terminal of Claim 5 wherein said blade includes a web portion connected to said crimp flange and having a plurality of undulations formed along opposite sides of said web portion so as to define lance-formed barbs which are capable of abutting against said plug housing and preventing removal of said electrical terminal by being pulled back through said one

channel and therefrom after said insulated conductor end and said electrical terminal have been inserted into said one channel of said plug housing.

13. A method of making a plug assembly, said method comprising the steps of:

(a) providing a plug housing and a plurality of electrical terminals, each of the electrical terminals having a crimp flange, at least one insulation piercing knife connected to the crimp flange and a blade connected to the crimp flange for insertion into an external electrical socket, the crimp flange having a pair of upwardly directed opposite side portions and a bottom portion extending between and interconnecting the side portions, the knife extending upwardly from the bottom portion of the crimp flange and disposed between the side portions of the crimp flange such that the end of the insulated conductor can be placed between the side portions of the crimp flange and over the piercing knife whereupon prior to insertion of the electrical terminal into the respective one of the channels of the plug housing the crimp flange is crimped onto the insulated conductor end by bending the side portions of the crimp flange toward one another over and downwardly toward the insulated conductor end such that the side portions of the crimp flange press the insulated conductor end downwardly upon the piercing knife which pierces and displaces insulation of the insulated conductor end and makes an electrical connection with an electrical wire of the insulated conductor and such that after crimping the crimp flange the electrical terminal may be inserted into the channel of the plug housing at the one of opposite ends of the plug housing to a point spaced interiorly from the other of the opposite ends of the plug housing;

(b) passing a pair of insulated conductors through channels of the plug housing such that separate portions of each of the insulated conductors extend from opposite ends of the plug housing;

(c) aligning ends of the electrical terminals with the portions of the insulated conductors which extend from one of the opposite ends of the plug housing;

(d) crimping the electrical terminals on the ends of the insulated conductors such that insulation on the insulated conductors is penetrated and electrical connections are made between the electrical terminals and electrical wires within the ends of the insulated conductors; and

(e) securing the crimped electrical terminals on the insulated conductor ends within the channels of the plug housing.

15. (Currently amended.) The method of Claim 13 wherein said electrical terminal is provided with a pair of insulation piercing knives cutout and bent upwardly from the bottom portion of the crimp flange.

16. (Previously amended.) The method of Claim 15 wherein said insulation piercing knives are provided substantially in a tandem alignment with one another.

17. The method of Claim 13 wherein the blade of the electrical terminal is provided with a web portion connected to the crimp flange and having a plurality of undulations formed along opposite sides of the web portion so as to define lance-formed barbs which abut against the

plug housing and prevent removal of the electrical terminal by being pulled back through the one channel and therefrom after the insulated conductor end and the electrical terminal have been inserted into the one channel of the plug housing.

18. (Previously amended.) The method of Claim 13 wherein the terminals are provided with an interconnecting strip and the strip is removed concurrently with the crimping of the electrical terminals.

19. (Previously amended.) The method of Claim 13 wherein the terminals are provided with an interconnecting strip and the strip is removed after the crimping of the electrical terminals.

20. (Previously amended.) The method of Claim 13 wherein the terminals are provided with an interconnecting strip and the strip is removed before the crimping of the electrical terminals.

21. (Previously added) The terminal of claim 1 in which the bottom portion is concave shaped.

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CPC — Abbreviation for calling party control. A telephone signaling system that notifies the terminating office and any line-connected auxiliary equipment when the calling party has disconnected. This system permits more efficient use of telephone trunk lines by removing the called party from the line as soon as the calling party disconnects. The CPC signal is a pulse to ground potential, usually 100 ms long, equivalent to shorting the two wires of the phone line together.

cpm — Abbreviation for cycles per minute.

C p wer supply — A device connected in the circuit between the cathode and grid of a vacuum tube to apply grid bias.

cps — 1. Abbreviation for cycles per second, an obsolete term. Replaced by the term *hertz*, abbreviated Hz. 2. The number of times per second an electronic event is repeated. 3. Abbreviation for characters per second when speaking of data transmission. A data-rate unit, not to be confused with cycles per second.

cps/bps — The number of characters or bytes per second (bits per track per second) written to or read from a magnetic tape.

CPU — Abbreviation for central processing unit. A primary unit of the computer system that controls interpretation and execution of instructions.

CPU portion — *See* chip sets.

crash — 1. A computer condition that causes it to stop working for some reason and need to be restarted by the operator. 2. Abrupt computer failure.

crash-locator beacon — Airborne equipment consisting of various transmitters, collapsible antennas, etc., designed to be ejected from a downed aircraft and to transmit beacon signals to help searching forces to locate the crashed aircraft.

crater lamp — 1. A glow-discharge type of vacuum tube whose brightness is proportional to the current passing through the tube. The glow discharge takes place in a cup or crater rather than on a plate as in a neon lamp. 2. A gaseous lamp usually containing neon. Provides a point source of light that can be modulated with a signal.

crazing — Checking of an insulation material when it is stressed and in contact with certain solvents or their vapors.

CRC — Abbreviation for cyclic redundancy check. 1. A method of error detection consisting of a character generated at the transmitting terminal that is matched with a character at the receiving terminal. Matched characters signify correct character reception; unmatched characters indicate an error. 2. An error-checking control technique utilizing a binary prime divisor that produces a unique remainder.

credence — A measure of confidence in a radar target detection; generally it is proportional to the target-return amplitude.

credit balance indicator — In a calculator, warning light to indicate a negative answer.

creepage — The conduction of electricity across the surface of a dielectric.

cre page distance — The shortest distance between conductors of opposite polarities, or between a live part and ground, measured over the surface of the supporting material.

creepag path — The path across the surface of a dielectric between two conductors. Lengthening the creepage path reduces the possibility of arc damage or tracking.

creepage surface — An insulating surface that provides physical separation between two electrical conductors of different potential.

creep-controlled bonding — A method of diffusion bonding in which enough pressure is exerted to cause significant creep deformation at the joint interfaces. The method is characterized by use of intermediate and low unit loads for a period of hours.

creep distance — The shortest distance on the surface of an insulator between two electrically conductive surfaces separated by the insulator.

creep recovery — The change in no-load output occurring with time after removal of a load that had been applied for a specific period of time.

crest factor — 1. The ratio of the peak voltage to the rms voltage of a waveform (with the dc component removed). 2. An instrument's dynamic range and ability to respond faithfully to waveform peaks as the rms value approaches full scale. Can also refer to the quality of rms-conversion techniques in general.

crest value — Also called peak value. The maximum absolute value of a function.

crest voltmeter — A peak-reading voltmeter.

crest working off-stage voltage — The highest instantaneous value of the off-state voltage that occurs across a thyristor, excluding all repetitive and nonrepetitive transient voltages.

crest working reverse voltage — The highest instantaneous value of the reverse voltage that occurs across a semiconductor diode or reverse-blocking thyristor, excluding all repetitive and nonrepetitive transient voltages.

CRI — *See* color rendering index.

crimp — 1. To compress or deform a connector barrel around a cable so as to make an electrical connection. 2. Final configuration of a terminal barrel formed by the compression of terminal barrel and wire.

crimp contact — A contact whose back portion is a hollow cylinder to allow it to accept a wire. After a bared wire is inserted, a swedging tool is applied to crimp the contact metal firmly against the wire. An excellent mechanical and electrical contact results. A crimp contact often is referred to as a solderless contact.

crimping — A method of attaching a terminal, splice, or contact to a conductor through the application of pressure.

crimping tool — A device used to apply solderless teminals to a conductor.

crimp terminal — A point at which the bared portion of the hookup wire is crimped to either the contact or a tab or pin that mates with the contact terminal.

crimp termination — Connection in which a metal sleeve is secured to a conductor by mechanically crimping the sleeve with pliers, presses, or automated crimping machines. Splices, terminals, and multicontact connectors are typical terminating devices attached by crimping. Suitable for all wire types.

crimp-type termination — Open-barrel or closed-barrel termination in which a stripped wire is inserted into or through a tube that is crimped to the wire with an appropriate tool.

crippled leapfrog test — In a computer, a variation of the leapfrog test in which the test is repeated from a single set of storage locations rather than from a changing set of storage locations. *See also* leapfrog test.

critical area — *See* picture element, 2.

critical angl — 1. The maximum angle at which a radio wave may be emitted from an antenna and will be returned to the earth by refraction in the ionosphere. 2. The maximum angle of incidence for which light will be transmitted from one medium to another. Light approaching the interface at angles greater than the critical angle will be reflected back into the first medium. 3. The maximum angle at which light can be propagated within a fiber. The sine of the critical angle equals the ratio of the numerical aperture to the index of refraction of the

Attorney Docket No. 029169-9001

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Art Unit: 2833

Examiner: F. Figueroa

Confirmation No. 9711

I, Arlette Porter-Sherley hereby certify that this correspondence is being deposited with the US Postal Service as first class mail in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, Mail Stop Appeal Brief – Patents on the date of my signature.

Signature

December 22, 2003
Date of Signature

APPELLANT'S BRIEF ON APPEAL

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Pursuant to the Notice of Appeal filed in the above-identified application on October 22, 2003 and 37 C.F.R. § 1.192, Applicant submits this brief in triplicate. Applicant is a small entity. The small entity filing fee of $165.00 accompanies this brief.

Real Party In Interest

The real party in interest is Eastco Corporation, which is the assignee of the sole inventor, George P. Pollack.

Related Appeals And Interferences

There are no related appeals or interferences.

Status Of Claims And Amendments

This is an appeal from the final rejection mailed July 22, 2003, rejecting all of the claims pending in the case (nos. 1-13 and 15-21). The claims on appeal, 1-13 and 15-21, are reproduced in clean form in the Appendix beginning on page 13.

Status Of Amendments

Claims 15 and 17 were amended after the final rejection to correct clerical errors. These amendments were entered on October 16, 2003, and are reflected in the claims reproduced in clean form in the Appendix.

Summary Of The Invention

The invention comprises:

1) unique electrical terminals;

2) an electrical plug assembly using such unique terminals; and

3) a method of making the plug assembly using the unique terminals.

The terminals are illustrated, for example, in Figures 8-12 of the application. Each terminal is of one-piece construction and has a crimp flange (28) and at least one (and preferably a pair) of insulation piercing knives (30) and a blade (32) for insertion into an electrical socket, all of which are integrally connected together. (Specification, page 9, lines 3-10.) The insulation piercing knives (30) of each electrical terminal 16 are spaced apart from one another in a substantially tandem-aligned relationship. The piercing knives are integrally connected to the crimp flange (28) by being cut-out and bent upwardly from the bottom portion of the crimp flange. Thus, the leading end of an insulated conductor (14) can be placed between the side portions (34) of a crimp flange (28) and over the piercing knives (30) whereupon the crimp

flange is crimped onto the insulated conductor (14) by bending the side portions (34) of the crimp flange (28) toward one another over and downwardly toward the insulated conductor (14). This causes the side portions (34) of the crimped flange (28) to press the insulated conductor (14) downwardly upon the piercing knives (30) which pierce and displace the outer layer of the insulation and make a substantially gas-tight electrical connection with the inner electrical wire within the insulated conductor. After the crimping is completed, the electrical terminal (16) is inserted into a channel (22) of a plug housing (12) as best seen in Figures 2 and 3 of the application. (Specification, page 9, line 18 to page 10, line 11.) The blade (32) of the electrical terminal (16) may also be provided with a web portion having a plurality of kinks or undulations (40). The kinks or undulations define lance-formed barbs (40) that abut the surface of the channel (22). This helps resist removal of the electrical terminals from the housing. (Specification, page 10, lines 25-34.)

Issues

I. Whether claims 1-3 and 21 are properly rejected under 35 U.S.C. § 103(a) as being unpatentable over Govaerts (BE 0544048) in view of Bellinger (U.S. Patent No. 5,567,187).

II. Whether claims 5-11 are properly rejected under 35 U.S.C. § 103(a) as being unpatentable over Bellinger in view of Govaerts.

III. Whether claims 13, 15 and 16 are properly rejected under 35 U.S.C. § 102(b) as being anticipated by Gilbert (U.S. Patent No. 2,229,288).

IV. Whether claim 17 is properly rejected under 35 U.S.C. § 103(a) as being unpatentable over Gilbert in view of Takemasa (U.S. Patent No. 6,045,408).

V. Whether claims 18-20 are properly rejected under 35 U.S.C. § 103(a) as being unpatentable over Gilbert in view of Ozaki (JP 09-213436).

Grouping Of Claims

It is Applicant's intention that each of the following groups of rejected claims each stand or fall together:

I. Claims 1-4 and 21;

II. Claims 5-12;

III. Claims 10 and 11; and

IV. Claims 13 and 15-20.

ARGUMENTS

This case is an example of an Examiner seeking to defeat patentability by using an Applicant's disclosure as a blueprint to knit together prior art and his personal opinion of what those skilled in the art would bring to that art. The fact that the inventive concepts underlying the claimed invention may seem relatively simple in hindsight has led the Examiner to improperly ignore the underlying patentability of Applicant's invention.

Rejection Of Claims 1-3 And 21 Under 35 U.S.C. § 103(a)

Claims 1–3 and 21 were rejected in the final office action of July 22, 2003 as unpatentable over Govaerts (BE 0544048) in view of Bellinger (U.S. Patent No. 5,567,187).

Among this grouping of claims, only claim 1 is independent. Independent claim 1 calls for an electrical terminal comprising an integral combination of a crimp flange and an insulation piercing knife. The insulation piercing knife projects from the bottom of the flange. A blade for insertion into an electrical socket extends from the crimp flange.

The Examiner argues that Govaerts discloses an electrical terminal comprising:

a) a crimp flange (12) with a pair of upwardly directed opposite side portions (11) and a bottom plate;

b) insulation piercing knives tandem aligned and integral with the crimp flange and projecting from the bottom plate; and

c) a terminal extending from the crimp flange for insertion into an external electrical socket.

From this, the Examiner concludes that Govaerts discloses the invention of the rejected claims except that it shows a round terminal instead of a flat blade. He then argues that Bellinger shows that a blade is an equivalent structure known in the terminal connector art and, therefore, one of ordinary skill in the art would have found obvious the substitution of blade terminals for the round terminals of Govaerts.

Govaerts is directed to a plug housing carrying two electrical terminals. Govaerts is fatally deficient *vis-à-vis* claim 1 in at least two important ways: 1) it does not teach or suggest an electrical terminal with a crimp flange; and 2) the piercing pins cited by the Examiner appear to be embedded in the body of the plug housing and not to be part of or integral with the terminal or any other structure in the device.

Contrary to the Examiner's position, element 11 of the Govaerts device is not a crimp flange since it is structured to receive an abutting surface 13 in the top half of the plug housing which apparently presses the wire down between the arms of this element spreading it out (rather than crimping it closed) and impaling the wire on the pins. Bellinger does not remedy this fatal shortcoming in the teaching of Govaerts. As to the piercing pins of Govaerts, it is noted that no translation is available and, therefore, the teaching is taken from the Figures only. Applicant believes that these Figures show (and the Examiner has not disagreed), that the piercing pins are

separate elements embedded in the body of the plug housing. This is contrary to the teaching of the present application which consistently calls for insulation piercing knives integral with a crimp flange. Again, Bellinger does not remedy this fatal shortcoming in the teaching of Govaerts.

Additionally, it is noted that during the course of the prosecution of this application, Applicant also argued that Govaerts "does not involve a crimp flange." The Examiner responded to this in the pending final rejection by noting that *The American Heritage Dictionary of the English Language*, 4th Edition, defines "crimp" as "to bend or mold into shape." He argued from this that the Govaerts' flanges are bent into shape and, therefore, they are properly considered crimp flanges.

First, the *American Heritage* definition is *in apropos* since it fails to reflect how one skilled in the art would understand the term "crimp flange." A more appropriate definition can be found, for example, in *Modern Dictionary of Electronics* 158 (Rudolf F. Graf ed., 7th ed., (Newnes 1999):

> **crimp-type termination** — Open-barrel or closed-barrel termination in which a stripped wire is inserted into or through a tube that is crimped to the wire with an appropriate tool. (Exhibit A).

Element 12 of Govaerts is not properly considered a crimp flange (as the Examiner seeks to do) since it fails to produce a crimp-type termination, as that term is properly understood in the art and in the above dictionary definition. Furthermore, and most importantly, there is no flange disclosed in Govaerts that is "bent into shape," so even the *American Heritage* definition does not support the Examiner's position.

It is also noted with respect to the rejection of claims 1-3 and 21 that during the course of the prosecution of this application, Applicant argued that the piercing pins of Govaerts "are not integral with the terminal." The Examiner notes in the pending final rejection that the term "integral" is sufficiently broad to embrace constructions united by such means as fastening and welding. In the case cited by the Examiner in support of this proposition, *In re Holt*, the Board of Appeals noted that the Appellant's specification did not expressly restrict the meaning of "integral" to one piece and that such a meaning was irreconcilable with the language of claim 1 in the case. In the present case, it is expressly taught that the electrical terminals are of a one-piece construction (*e.g.*, Specification, page 9, line 4) and such a construction is completely consistent with the figures in the case and the language of the claims. Therefore, it is improper to interpret Govaerts as teaching integral piercing pins.

Rejection Of Claims 5-11 Under 35 U.S.C. § 103(a)

Claims 5-11 were rejected under 35 U.S.C. §103 as being unpatentable over Bellinger in view of Govaerts. The Examiner argues that Bellinger discloses a plug housing (20) with opposite ends and spaced apart channels, a pair of insulated conductors (36), and a pair of electrical terminals including a crimp flange, a concave arcuate-shaped bottom portion and a blade connected to the crimp flange. The Examiner acknowledges that Bellinger fails to disclose insulation piercing knives, but argues that it would be obvious to supply this teaching from Govaerts. The Examiner also argues with regard to claims 6 and 7 that Bellinger shows the housing and the electrical terminal with a one-piece construction, with regard to claims 8 and 9 that Bellinger shows the claimed structure in Figure 2 of that reference, and finally with regard to

claims 10 and 11 that Govaerts shows a pair of insulating piercing knives disposed in a tandem alignment with each other.

Among these rejected claims, only claim 5 is an independent claim. Claim 5 is directed to an electrical plug assembly, including a plug housing, a pair of insulated conductors and a pair of electrical terminals insertable into channels in the plug housing. The electrical terminals include a crimp flange with a pair of upwardly directed opposite side portions and a concave arcuate-shaped bottom portion extending therebetween. At least one insulation piercing knife is integral with the crimp flange and projects upwardly from the bottom portion into the space between the side portions of the crimp flange.

The principal reference cited by the Examiner in support of the rejection of claims 5-11, Bellinger, does describe a plug housing with channels, insulated conductors and electrical terminals connected to the conductors. However, Bellinger fails utterly to teach or suggest the insulation piercing which is the raison d'être of the claimed invention. In Bellinger, a portion of the insulation of the insulated wire must first be removed in order to establish electrical contact with flange arms (52). The flange arms, when ultimately crimped, grip the insulation-free wire portion but do not cooperate with or include any means for piercing the wire insulation. Piercing the wire insulation is unnecessary since the patent requires that the insulation be removed before the crimping is completed. Furthermore, contrary to the Examiner's position, it would not be obvious to supply this teaching from Govaerts because there is no insulation left to pierce in the Bellinger invention. Furthermore, Govaerts fails even to teach a crimp flange as required in claim 5 and as discussed above. It fails, as well, to teach an integral insulation piercing knife, also as discussed above.

Rejected dependent claim 6 drives home the inappropriateness of combining these references since it calls for the housing of the electrical plug assembly to be of a one-piece construction. Govaerts requires a two-piece construction since the conductors are gripped in that structure only by the action of joining the two halves of the housing. Therefore, the attempt to import the teaching of Govaerts into Bellinger fails.

Rejected dependent claim 10 requires that at least one insulation piercing knife of the electrical terminal is a pair of insulation piercing knives cut out and bent upwardly from the bottom portion of the crimp flange. Claim 11 further limits claim 10 by requiring that the insulation piercing knives be disposed substantially in tandem alignment with one another. The Examiner argues that Govaerts teaches this. Applicant respectfully disagrees. As far as Applicant is able to determine from the figures of this untranslated reference, the pointed pins are separate articles imbedded in the Govaerts' housing and not cut-out or bent upwardly from element 11. Claims 10 and 11 are, therefore, believed to be patentable on this independent basis.

Rejection Of Claims 4 and 12

Claims 4 and 12 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Bellinger and Govaerts as applied to claims 1 and 5, and further in view of Takemasa (U.S. Patent No. 6,045,408). Claim 4 is a dependent claim directed to the electrical terminal of claim 1 in which the blades include a web portion having barbs for abutting against the plug housing to resist removal of the electrical terminal. Claim 12 is a dependent claim directed to the terminal of claim 5 where the blades have web portions with a plurality of undulations defining lance-formed barbs which abut the plug housing and prevent removal from the housing. These claims are believed to be patentable over the noted combination of references on the basis of the above

noted patentability of the independent claims from which they respectively depend, claims 1 and 5.

Rejection Of Claims 13 and 15-16 Under 35 U.S.C. § 102(b)

Claim 13 is directed to a method of making a plug assembly including providing a housing and a plurality of electrical terminals with the unique features discussed above with respect to independent claims 1 and 5. Dependent claims 15 and 16 further limit independent method claim 13 by calling for the electrical terminals to have insulation piercing knives cut out and bent upwardly from the bottom portion of the crimp flange of the terminal and for the piercing knives to be provided substantially in tandem alignment.

Claims 13 and 15-16 were rejected as being anticipated by Gilbert (U.S. Patent No. 2,229,288). The Examiner argued that Gilbert teaches providing a plug housing with a plurality of terminals, passing insulated conductors through the channels in the housing, aligning the ends of the terminals with the wires, crimping the terminals to the conductors and securing the terminals in the channels of the housing. Gilbert, however, does not employ insulation piercing terminals nor an insulation piercing method. Rather, Gilbert requires that the insulation be removed from the conductor ends before assembling the electrical connector. This, of course, is completely at odds with the present invention in which piercing knives pierce and displace the outer layer of the insulation of an insulated conductor to achieve a substantially gas-tight electrical connection with the inner electrical wire within the insulated conductor. This essential element of the invention was given no weight in the rejection over Gilbert.

Method claims 13 and 15-16 are believed to be patentable based on the noted structural limitations of the unique terminals of the invention because these structural limitations affect the

method in a manipulative sense. They do not amount to the mere claiming of the use of a particular structure. The Examiner disagrees and therefore did not give the structural limitations in the claim patentable weight.

Applicant believes the Examiner is in error in refusing to give patentable weight to the structural features of the electrical terminals because these structural features are essential to the practice of the method. For example, the knife extending upwardly from the bottom portion of the crimp flange is essential to the practice of the claimed method: when the crimp flange is crimped, the insulated conductor is pressed downwardly onto the knife which, in accordance with the method of the claim, pierces and displaces the insulation of the conductor. The structural features of the electrical terminals are essential to the manipulations called for in the claimed method. The resulting method claim is patentable over Gilbert because, *inter alia*, Gilbert fails to teach or suggest crimping a crimp flange to press an insulated conductor down onto a knife to pierce and displace the insulation of the conductor, as required in the rejected method claims.

Rejection Of Claim 17 Under 35 U.S.C. § 103(a)

Claim 17 is a claim dependent on independent method claim 13 which stands rejected over Gilbert in view of Takemasa (U.S. Patent No. 6,045,408). This dependent claim is believed to be patentable on the basis of the patentability of claim 13, as discussed above.

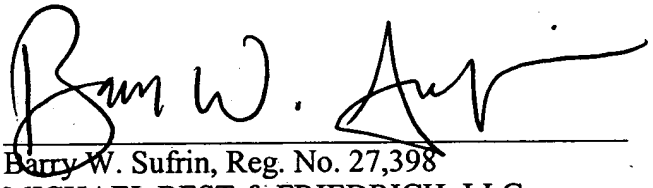
Rejection Of Claims 18-20 Under 35 U.S.C. § 103(a)

Dependent claims 18-20 were rejected as unpatentable over Gilbert in view of Ozaki (JP 09-213436). These claims, which are dependent on method claim 13, are believed to be patentable on the basis of the patentability of claim 13, as discussed above.

CONCLUSION

35 U.S.C. § 103(a) For the foregoing reasons, Applicant respectfully requests that the Examiner's rejection of all of the pending claims (nos. 1-13 and 15-21) be reversed and these claims be indicated as allowable.

Respectfully submitted,



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Date: December 22, 2003

APPENDIX

1. An electrical terminal, comprising:

(a) a crimp flange having a pair of upwardly directed opposite side portions and a bottom portion extending between and interconnecting said side portions;

(b) at least one insulation piercing knife integral with said crimp flange projecting from said bottom portion into the space between said side portions; and

(c) a blade extending from said crimp flange for insertion into an electrical socket.

2. The terminal of Claim 1 wherein said at least one insulation piercing knife is a pair of insulation piercing knives cut out and bent upwardly from said bottom portion of said crimp flange.

3. The terminal of Claim 2 wherein said insulation piercing knives are disposed substantially in a tandem alignment with one another.

4. The terminal of Claim 1 wherein said blades includes a web portion connected to said crimp flange and a plurality of abutting undulations formed along opposite sides of said web portion defining barbs for abutting against a plug housing to resist removal of said electrical terminal therefrom.

5. An electrical plug assembly, comprising:

(a) a plug housing having opposite ends and defining a pair of spaced apart channels therethrough open at each of said opposite ends thereof;

(b) a pair of insulated conductors each having an end and an electrical wire and a layer of insulation covering said wire and being disposed at least partially within one of said channels of said plug housing; and

(c) a pair of electrical terminals each being insertable into one of said channels of said plug housing at one of said opposite ends of said plug housing, each said terminal including:

(i) a crimp flange having a pair of upwardly directed opposite side portions and a concave arcuate-shaped bottom portion extending between and interconnecting said side portions;

(ii) at least one insulation piercing knife integral with said crimp flange projecting upwardly from said bottom portion into the space between said side portions; and

(iii) a blade extending from said crimp flange for insertion into an external electrical socket for making an electrical connection.

6. The assembly of Claim 5 wherein said housing is of a one-piece construction.

7. The assembly of Claim 5 wherein each of said electrical terminals has a one-piece construction.

8. The assembly of Claim 5 wherein:

each of said electrical terminals has opposite ends; and

said crimp flange of each said electrical terminal is disposed at a rearward position on said electrical terminal adjacent to one of said opposite ends thereof.

9. The assembly of Claim 8 wherein said blade of each of said electrical terminals is disposed at a forward position on said electrical terminal opposite from said crimp flange and adjacent to the other end of said opposite ends of said electrical terminal and extending therefrom toward but spaced from said one opposite end of said electrical terminal.

10. The assembly of Claim 5 wherein said at least one insulation piercing knife of said electrical terminal is a pair of insulation piercing knives cut out and bent upwardly from said bottom portion of said crimp flange of said electrical terminal and disposed said side portions of said crimp flange of said electrical terminal.

11. The terminal of Claim 10 wherein said insulation piercing knives are disposed substantially in a tandem alignment with one another.

12. The terminal of Claim 5 wherein said blade includes a web portion connected to said crimp flange and having a plurality of undulations formed along opposite sides of said web portion so as to define lance-formed barbs which are capable of abutting against said plug housing and preventing removal of said electrical terminal by being pulled back through said one

channel and therefrom after said insulated conductor end and said electrical terminal have been inserted into said one channel of said plug housing.

13. A method of making a plug assembly, said method comprising the steps of:

(a) providing a plug housing and a plurality of electrical terminals, each of the electrical terminals having a crimp flange, at least one insulation piercing knife connected to the crimp flange and a blade connected to the crimp flange for insertion into an external electrical socket, the crimp flange having a pair of upwardly directed opposite side portions and a bottom portion extending between and interconnecting the side portions, the knife extending upwardly from the bottom portion of the crimp flange and disposed between the side portions of the crimp flange such that the end of the insulated conductor can be placed between the side portions of the crimp flange and over the piercing knife whereupon prior to insertion of the electrical terminal into the respective one of the channels of the plug housing the crimp flange is crimped onto the insulated conductor end by bending the side portions of the crimp flange toward one another over and downwardly toward the insulated conductor end such that the side portions of the crimp flange press the insulated conductor end downwardly upon the piercing knife which pierces and displaces insulation of the insulated conductor end and makes an electrical connection with an electrical wire of the insulated conductor and such that after crimping the crimp flange the electrical terminal may be inserted into the channel of the plug housing at the one of opposite ends of the plug housing to a point spaced interiorly from the other of the opposite ends of the plug housing;

(b) passing a pair of insulated conductors through channels of the plug housing such that separate portions of each of the insulated conductors extend from opposite ends of the plug housing;

(c) aligning ends of the electrical terminals with the portions of the insulated conductors which extend from one of the opposite ends of the plug housing;

(d) crimping the electrical terminals on the ends of the insulated conductors such that insulation on the insulated conductors is penetrated and electrical connections are made between the electrical terminals and electrical wires within the ends of the insulated conductors; and

(e) securing the crimped electrical terminals on the insulated conductor ends within the channels of the plug housing.

15. (Currently amended.) The method of Claim 13 wherein said electrical terminal is provided with a pair of insulation piercing knives cutout and bent upwardly from the bottom portion of the crimp flange.

16. (Previously amended.) The method of Claim 15 wherein said insulation piercing knives are provided substantially in a tandem alignment with one another.

17. The method of Claim 13 wherein the blade of the electrical terminal is provided with a web portion connected to the crimp flange and having a plurality of undulations formed along opposite sides of the web portion so as to define lance-formed barbs which abut against the

plug housing and prevent removal of the electrical terminal by being pulled back through the one channel and therefrom after the insulated conductor end and the electrical terminal have been inserted into the one channel of the plug housing.

18. (Previously amended.) The method of Claim 13 wherein the terminals are provided with an interconnecting strip and the strip is removed concurrently with the crimping of the electrical terminals.

19. (Previously amended.) The method of Claim 13 wherein the terminals are provided with an interconnecting strip and the strip is removed after the crimping of the electrical terminals.

20. (Previously amended.) The method of Claim 13 wherein the terminals are provided with an interconnecting strip and the strip is removed before the crimping of the electrical terminals.

21. (Previously added) The terminal of claim 1 in which the bottom portion is concave shaped.

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CPC — Abbreviation for calling party control. A telephone signaling system that notifies the terminating office and any line-connected auxiliary equipment when the calling party has disconnected. This system permits more efficient use of telephone trunk lines by removing the called party from the line as soon as the calling party disconnects. The CPC signal is a pulse to ground potential, usually 100 ms long, equivalent to shorting the two wires of the phone line together.

cpm — Abbreviation for cycles per minute.

C power supply — A device connected in the circuit between the cathode and grid of a vacuum tube to apply grid bias.

cps — 1. Abbreviation for cycles per second, an obsolete term. Replaced by the term *hertz*, abbreviated Hz. 2. The number of times per second an electronic event is repeated. 3. Abbreviation for characters per second when speaking of data transmission. A data-rate unit, not to be confused with cycles per second.

cps/bps — The number of characters or bytes per second (bits per track per second) written to or read from a magnetic tape.

CPU — Abbreviation for central processing unit. A primary unit of the computer system that controls interpretation and execution of instructions.

CPU portion — *See* chip sets.

crash — 1. A computer condition that causes it to stop working for some reason and need to be restarted by the operator. 2. Abrupt computer failure.

crash-locator beacon — Airborne equipment consisting of various transmitters, collapsible antennas, etc., designed to be ejected from a downed aircraft and to transmit beacon signals to help searching forces to locate the crashed aircraft.

crater lamp — 1. A glow-discharge type of vacuum tube whose brightness is proportional to the current passing through the tube. The glow discharge takes place in a cup or crater rather than on a plate as in a neon lamp. 2. A gaseous lamp usually containing neon. Provides a point source of light that can be modulated with a signal.

crazing — Checking of an insulation material when it is stressed and in contact with certain solvents or their vapors.

CRC — Abbreviation for cyclic redundancy check. 1. A method of error detection consisting of a character generated at the transmitting terminal that is matched with a character at the receiving terminal. Matched characters signify correct character reception; unmatched characters indicate an error. 2. An error-checking control technique utilizing a binary prime divisor that produces a unique remainder.

cred nce — A measure of confidence in a radar target detection; generally it is proportional to the target-return amplitude.

credit balance indicator — In a calculator, warning light to indicate a negative answer.

creepage — The conduction of electricity across the surface of a dielectric.

creepage distance — The shortest distance between conductors of opposite polarities, or between a live part and ground, measured over the surface of the supporting material.

creepag path — The path across the surface of a dielectric between two conductors. Lengthening the creepage path reduces the possibility of arc damage or tracking.

creepage surfac — An insulating surface that provides physical separation between two electrical conductors of different potential.

creep-controlled bonding — A method of diffusion bonding in which enough pressure is exerted to cause significant creep deformation at the joint interfaces. The method is characterized by use of intermediate and low unit loads for a period of hours.

creep distance — The shortest distance on the surface of an insulator between two electrically conductive surfaces separated by the insulator.

creep recovery — The change in no-load output occurring with time after removal of a load that had been applied for a specific period of time.

crest factor — 1. The ratio of the peak voltage to the rms voltage of a waveform (with the dc component removed). 2. An instrument's dynamic range and ability to respond faithfully to waveform peaks as the rms value approaches full scale. Can also refer to the quality of rms-conversion techniques in general.

crest value — Also called peak value. The maximum absolute value of a function.

crest voltmeter — A peak-reading voltmeter.

crest working off-stage voltage — The highest instantaneous value of the off-state voltage that occurs across a thyristor, excluding all repetitive and nonrepetitive transient voltages.

crest working reverse voltage — The highest instantaneous value of the reverse voltage that occurs across a semiconductor diode or reverse-blocking thyristor, excluding all repetitive and nonrepetitive transient voltages.

CRI — *See* color rendering index.

crimp — 1. To compress or deform a connector barrel around a cable so as to make an electrical connection. 2. Final configuration of a terminal barrel formed by the compression of terminal barrel and wire.

crimp contact — A contact whose back portion is a hollow cylinder to allow it to accept a wire. After a bared wire is inserted, a swedging tool is applied to crimp the contact metal firmly against the wire. An excellent mechanical and electrical contact results. A crimp contact often is referred to as a solderless contact.

crimping — A method of attaching a terminal, splice, or contact to a conductor through the application of pressure.

crimping tool — A device used to apply solderless teminals to a conductor.

crimp terminal — A point at which the bared portion of the hookup wire is crimped to either the contact or a tab or pin that mates with the contact terminal.

crimp termination — Connection in which a metal sleeve is secured to a conductor by mechanically crimping the sleeve with pliers, presses, or automated crimping machines. Splices, terminals, and multicontact connectors are typical terminating devices attached by crimping. Suitable for all wire types.

crimp-type termination — Open-barrel or closed-barrel termination in which a stripped wire is inserted into or through a tube that is crimped to the wire with an appropriate tool.

crippled leapfrog test — In a computer, a variation of the leapfrog test in which the test is repeated from a single set of storage locations rather than from a changing set of storage locations. *See also* leapfrog test.

critical area — *See* picture element, 2.

critical angl — 1. The maximum angle at which a radio wave may be emitted from an antenna and will be returned to the earth by refraction in the ionosphere. 2. The maximum angle of incidence for which light will be transmitted from one medium to another. Light approaching the interface at angles greater than the critical angle will be reflected back into the first medium. 3. The maximum angle at which light can be propagated within a fiber. The sine of the critical angle equals the ratio of the numerical aperture to the index of refraction of the

SEVENTH EDITION

MODERN DICTIONARY of ELECTRONICS

RUDOLF F. GRAF

Newnes